

## ■ Practise

For help with questions 1 and 2, see Example 1.

1. Solve using the method of elimination.

a) $x + y = 2$	b) $x - y = -1$
$3x - y = 2$	$3x + y = -7$
c) $x + 3y = 7$	d) $5x + 2y = -11$
$x + y = 3$	$3x + 2y = -9$

2. Solve using the method of elimination.  
Check each solution.

a) $2x + y = -5$	b) $4x - y = -1$
$-2x + y = -1$	$-4x - 3y = -19$
c) $2x + y = 8$	d) $3x + 2y = -1$
$4x - y = 4$	$-3x + 4y = 7$

For help with questions 3 and 4, see Example 2.

3. Find the point of intersection of each pair of lines.

a) $x + 2y = 2$	b) $3x + 5y = 12$
$3x + 5y = 4$	$2x - y = -5$
c) $3x + y = 13$	d) $6x + 5y = 12$
$2x + 3y = 18$	$3x - 4y = 6$

4. Solve by elimination. Check each solution.

a) $4x + 3y = 4$	b) $5x - 3y = 25$
$8x - y = 1$	$10x + 3y = 5$
c) $5x + 2y = 48$	d) $2x + 3y = 8$
$x + y = 15$	$x - 2y = -3$

For help with questions 5 to 7, see Example 3.

5. Solve by elimination. Check each solution.

a) $3x - 2y = 5$	b) $5m + 2n = 5$
$2x + 3y = 12$	$2m + 3n = 13$
c) $3a - 4b = 10$	d) $3h - 4k = 5$
$5a - 12b = 6$	$5h + 3k = -11$

6. Find the point of intersection of each pair of lines. Check each solution.

a) $3x + y = 13$	b) $2x + 3y = -18$
$2x + 3y = 18$	$3x - 5y = 11$
c) $3x - 2y + 2 = 0$	d) $2a - 3b = -10$
$7x - 6y + 11 = 0$	$4a + b = 1$

7. Solve each system of linear equations by elimination. Check your answers.

a) $4x - 9y = 4$	b) $2x + 9y = -$
$6x + 15y = -13$	$5x - 2y = 39$
c) $3a - 2b + 4 = 0$	d) $2u + 5v = 41$
$2a - 5b - 1 = 0$	$3u - 2v = 1$

## Connect and Apply

For help with questions 8 and 9, see Example 4.

8. Mehrab works in a department store selling sports equipment. Baseball gloves cost \$5 each and bats cost \$14 each. One shift, he sells 28 items. His receipts total \$647.

- a) How many bats did Mehrab sell?  
b) How many gloves did he sell?

9. Liz works at the ballpark selling bottled water. She sells 37 bottles in one shift. Large bottles sell for \$5 each and the small bottles sell for \$3 each. At the end of the game, she has taken in \$131.

- a) How many large bottles did Liz sell?  
b) How many small bottles did she sell?

10. Consider the linear system  $2x - 3y = 5$  and  $4x + y = 8$ .

- a) Solve by elimination.  
b) Solve by substitution.  
c) Which method do you prefer? Why?

11. Explain how you would solve the system  $3x + 2y = 5$  and  $4x + 5y = 11$  using the method of elimination. Do not actually solve the system.

12. Expand and simplify each equation. Then, solve the linear system.

a) $2(3x - 1) - (y + 4) = -7$
$4(1 - 2x) - 3(3 - y) = -12$
b) $3(a - 1) - 3(b - 3) = 0$
$3(a + 2) - (b - 7) = 20$
c) $5(k + 5) - 2(n - 3) = 62$
$4(k - 7) - (n + 4) = -9$

13. To solve the following linear system by elimination, Brent first multiplied each equation by 10. Explain why he did this step. Complete the solution.

$$0.3x - 0.5y = 1.2$$

$$0.7x - 0.2y = -0.1$$

14. Solve each linear system.

a)  $0.2x - 0.3y = 1.3$

$$0.5x + 0.2y = 2.3$$

b)  $0.1a - 0.4b = 1.9$

$$0.4a + 0.5b = -0.8$$

15. Bhargav stops in at a deli to get lunch for his crew. He buys five roast beef and three vegetarian sandwiches and the order costs \$27.50. The next week, he pays \$23.00 for two roast beef and six vegetarian sandwiches. How much does one roast beef sandwich cost?

16. Maria rented the same car twice in one month. She paid \$180 the first time for 3 days and she drove a total of 150 km. The next time, she also paid \$180 and had the vehicle for only 2 days, but travelled 400 km.

- a) What was the cost per day?  
b) What was the cost per kilometre?

17. **Chapter Problem** The Clarke's son suggests that they rent a car that costs \$250 for the week plus 22¢/km. Their daughter does not want to drive far, so she suggests a car that is only \$96 for the week but 50¢/km.

- a) Write an equation to represent the cost of the car suggested by the son.  
b) Write an equation to represent the cost of the car suggested by the daughter.  
c) When will the two cars cost the same? Use the method of elimination to solve.  
d) If the Clarkes plan to drive 500 km, which option is less expensive?

18. What happens when you solve the system  $2x + 3y = 6$  and  $6x + 9y = 0$  by elimination? Use a graph in your explanation.

## Achievement Check

19. a) Nita's class visited a provincial site to view some ancient rock drawings. Two adults and five students in one van paid \$77 for the visit. Two adults and seven students in a second van paid \$95. What were the entry prices for a student and an adult? Verify your solution.



- b) Katie and Chris each solved a system of two linear equations as shown. Whose method is correct? Explain why.

Katie

$$2x + y = 5$$

$$+ \quad x - y = 1$$

$$3x = 6$$

$$x = 2$$

$$2x + y = 5$$

$$2(2) + y = 5$$

$$4 + y = 5$$

$$y = 1$$

The solution is (2, 1).

Chris

$$2x + y = 5$$

$$- \quad x - y = 1$$

$$x = 4$$

$$4 - y = 1$$

$$-y = -3$$

$$y = 3$$

The solution is (4, 3).

## Extend

20. Solve by elimination.

a)  $\frac{1}{2}m + n = -4$

$$\frac{m}{2} - \frac{3n}{2} = 1$$

c)  $\frac{t-5}{3} + \frac{w+1}{2} = 1$

$$\frac{t-1}{5} + \frac{w+2}{3} = 2$$

b)  $\frac{4a}{3} - \frac{b}{4} = 6$

$$\frac{5a}{6} + b = 13$$

21. Consider the linear system  $ax + by = c$   
 $dx + ey = f$

Find a general solution for  $x$  and  $y$ . State any restrictions on the values of  $a$ ,  $b$ ,  $c$ ,  $d$ ,  $e$ , and  $f$ .

22. Solve the system of equations.

$$x + 3y - z = -14$$

$$7x + 6y + z = 1$$

$$4x - 2y - 5z = 11$$